

REMARKS

New independent claim 15 has been drafted to include the limitations of claims 1, 2, 3, and 6, to address the Examiner's objection under 35 USC 112 and to better define the invention. New claims 16-18 (see pages 8 and 9 of the specification for support with regard to claims 17 and 18) have been added, and dependent claims 4, 5, 8 and 9 have been amended to ultimately depend from independent claim 15. Claims 1-3, 6, 7 and 10-14 have been cancelled. Accordingly, claims 4, 5, 8, 9, and 15-18 are in the case.

In the Office Action, claim 6 had been rejected as being obvious over Hamada U.S. Patent 6,118,481 taken in view of Kondo et al. U.S. Patent 6,829,008. Applicant respectfully traverses this rejection as to any degree it is deemed applicable to new independent claim 15.

Claim 15 recites a method for producing electronic video signals representative of a focused moveable image, including the following steps: providing a charge coupled sensor device, and masking substantially less than half of the lines of said device to form a masked storage area and a substantially larger unmasked sensing area; disposing said sensing area in the path of said image; providing a shutter for periodically blocking said image from said sensing area; and providing a first vertical clock, a second vertical clock, and a pixel rate clock; said first vertical clock being operative to shift lines in the sensing area, said second vertical clock being operative to shift lines in the storage area, and said pixel rate clock being operative to clock out

pixels from the storage area; wherein, during a vertical blanking period after shutter closure, lines are shifted from the sensing area to fill the storage area using said first and second vertical clocks at relatively high speed and during the remainder of said shutter closure time further lines are shifted from the sensing area to the storage area and lines are shifted through the storage area and clocked out using said first and second vertical clocks at relatively low speed, and after shutter opening, lines in the storage area are clocked out using said second vertical clock at a relatively low speed.

In rejecting claim 6 (predecessor to the current independent claim 15), the Office Action includes the following statement:

“Referring to claim 6, the Hamada reference discloses in Figures 5-7 and 9, a method for producing electronic video signals representative of a focused moveable image (e.g., moving image captured by TV camera, see Col. 1, lines 15-25), comprising the steps of: providing a charge coupled device (CCD 11, see Col. 5, lines 55-60), substantially less than half of the lines of said device to form a storage area (storage area 11s is formed in a matrix of 3 rows x16 columns, see Col. 6, lines 55-58) and a substantially larger unmasked sensing area (image area 11i is formed in a matrix of 12 rows x16 columns, see Col. 5, lines 59-65); disposing said sensing area in the path of said image; providing a shutter (16, see Col. 9, lines 39-43) for periodically blocking said image from said sensing area; and providing clocking signals (Φ_a , Φ_b , Φ_V and Φ_h as shown in Figures 6-7, see Col. 9, lines 43-58) to said device to shift sensed lines of said image from said sensing area to said storage area and to clock image representative electronic video signals out of said device; wherein said step of providing clocking signals to said device includes providing a first vertical clock (Φ_a and Φ_b), a second vertical clock (Φ_V), and a pixel rate clock (Φ_h); wherein said first vertical clock is operative to shift lines in the sensing area and said second vertical clock is operative to shift lines in the storage area as showing (sic) Figure 5; wherein, during a vertical blanking period after shutter closure (e.g., during the first imaging operation), lines are shifted from the sensing area to fill the storage area using said first and

second vertical clocks at relatively high speed (See Col. 6, lines 30-33 and Col. 2, lines 55-56) and during the remainder of said shutter closure time (e.g., in the second imaging operation) further lines are shifted from the sensing area to the storage area and lines are shifted through the storage area and read out using said first and second vertical clocks at relatively low speed (e.g., sequentially transfers the information charges one horizontal line each time to the output section 11d, see Col. 7, lines 1-8 and Col. 8, lines 40-55), and after shutter opening (e.g., when the shutter control signal in the leading edge as shown in Figure 9, see Col. 9, lines 39-41), lines in the storage area are read out using said second clock at a relatively low speed (e.g., the continuous image signals $Y_0(t)$ are transferred from the storage section 11s to a signal processing circuit 14, see Col. 15-23). However, the Hamada reference does not explicitly show the storage section (11d) is a masked storage area.

"The Kondo reference discloses in Figure 11, a method for producing electronic video signals representative of a focused moveable image (e.g., moving image captured by video movie camera, see Col. 7, lines 50-55 and Col. 1, lines 23-35), comprising the steps of: providing a charge coupled device (CCD, see Col. 8, lines 31-35), masking substantially less than half of the lines of said device to form a masked storage area (storage area 2 is covered with an aluminum light-shielding layer, see Col. 8, lines 65-67 and Col. 9, lines 1-5) and a substantially larger unmasked sensing area (image area 1, see Col. 8, lines 51-54). The Kuroda (sic) reference is evidence that one of ordinary skill in the art at the time to see more advantages to storage area of the image device is covered with an aluminum light-shielding layer so that the readout information charge transferred from image section can be accurate without effecting by any unwanted incident light. For that reason, it would have been obvious to one of ordinary skill in the art to modify the imaging pick-up device of Hamada ('481) by providing a masked storage area as taught by Kondo ('008)."

Reconsideration of the Examiner's position is respectfully requested for the reasons that follow. The Hamada Patent, in the background portion thereof, described the problem that is addressed by Hamada (col. 3, lines 41-67) as follows:

"For the foregoing electronic still camera, motion images are formed by successively operating the solid state image pick-up

device 1. The user watches the motion images and can extract a desired still image included in the motion image at this time because the motion image is merely used for confirmation by the user. Therefore, ordinarily, an information amount of the image signal $Y0(t)$ is previously set to be small, so that the signal process in the signal processing circuit 4 is simplified. That is to say, the image signal $Y0(t)$ is reduced on a predetermined column or row unit basis at an input stage of the signal processing circuit 4 and the information amount is decreased, so that subsequent various signal processes are simplified, and high-speed processing can thereby be realized.

"However, a configuration in which the image signal $Y0(t)$ is reduced and carried to the signal processing circuit creates a problem that a circuit scale of the signal processing circuit 4 is increased and electric power consumption in the sections also increases. The solid state image pick-up device 1 itself of the frame transfer system having the image pick-up section 1i and the storage section is also has (sic) a problem that, as compared with a solid state image pick-up device of an interline transfer system in which a vertical transfer section is disposed between columns of light receiving pixels arranged in a matrix form, a chip area is large and manufacturing costs rise."

Hamada then stated that it was an object of his invention "to provide an inexpensive cheap electronic still camera having a high performance by realizing a decrease in costs while suppressing an increase in electric power consumption."

Reference can then be made, for example, to Figures 5 and 6 of Hamada (which, together with its accompanying text, was relied upon by the Examiner for the bulk of the rejection of Applicant's previous claim 6) which can then be studied to see how Hamada approached solution of the problem he posed. In Figure 5, every fourth row (the non-cross-hatched rows) of image pick-up section 11i are called "permanent accumulation pixels" and the rest of the rows are called "selective accumulation pixels." These are respectively clocked by different clocks Φa and Φb . A storage section 11s is stated to have a number of rows that correspond to the "accumulation pixels" rows of

the image pick-up section (e.g. col. 6, lines 45-54). In a "first" imaging operation, the storage section 11s fetches the information charges from the permanent accumulation pixels of the image pick-up section 11i at a period that is four times as long as that of the first and second frame clocks Φ_a and Φ_b and transfers the fetched information charges one row by one every horizontal scan period to a horizontal transfer section 1h. In a "second" imaging operation, the period of a vertical transfer clock Φ_v (of the storage section 11s) is made to coincide with periods of the first and second frame transfer clocks Φ_a and Φ_b . The storage section 11s operates as an extending portion of the shift registers of the image pick-up section 11i and sequentially transfers the information charges from the permanent accumulation pixels and selective accumulation pixels to a horizontal transfer section 11h.

From the foregoing, it is readily seen that the purpose, operation, and steps of Hamada are very different than those defined by Applicant's independent claim 15, which, as explained, for example in conjunction with Figures 2 and 3 of Applicant's specification, permits a CCD sensor for an electronic video camera to operate more efficiently by virtue of a unique technique of shifting lines at specified different rates and times into and out of a masked storage area. The differences between Applicant's technique and Hamada's are several. As an example, in addition to the absence of a masked storage area in Hamada, note that in Figure 6 of Hamada there are no clock signals and no transfer to a storage area during the image sensing period. Contrast this with Figure 3 of Applicant, which shows the clocking out of the masked area at low speed after the shutter is opened, and with Applicant's claim 15 which recites, inter alia, that after shutter opening, lines in the storage area are clocked out using the second vertical clock at a relatively low speed.

The other citation applied against the claims is Kondo et al. U.S. Patent 6,829,008. (In the Office Action, Kondo et al. was the primary citation against claim 1, but the secondary citation against claim 6, the rejection of which had Hamada as the primary citation.) The background portion of Kondo et al. describes the problem that Kondo et al. seek to solve. Features such as AF (auto focus) and AE (auto exposure) have requirements which, in megapixel cameras, use certain additional components and/or techniques and result in inefficiencies, including increased power consumption. Kondo et al. seek to address this difficulty by providing a solid-state image sensing apparatus capable of performing high-precision image sensing adjustment (for example, AF and AE) without adding any camera mechanism or increasing power consumption. Part of this solution is the CCD sensor of Kondo's Figure 11. The sensor has a partial storage area (2) that is shielded and which, in this respect, has a similarity to Applicant's masked storage area. However, the unique teaching of clocking of signals into and out of the sensing area and the storage area, which are key steps in Applicant's independent claim 15 (see, again, Applicant's Figure 3 and the language of claim 15), are not disclosed or suggested in Kondo et al. The clocking of Kondo et al. Figure 11 is described at length and in detail in Kondo et al., and will not be reproduced here. It has been carefully studied, and is quite different than the procedure, relative clocking speeds, and timing as set forth in Applicant's claim 15 and Applicant's Figure 3. The Examiner apparently recognized this, and decided to use Hamada as the primary citation against Applicant's prior claim 6. (As demonstrated above, however, Hamada is also deficient in teaching the important features of claim 15, successor to the prior claim 6.)

In the Office Action, the Examiner argues that it would have been obvious to one skilled in the art to add the masked storage area of Kondo U.S. Patent 6,829,008 to the device of Hamada. However, this argument fails for at least three reasons.

First, in the absence of Applicant's teachings, there would be no reason or incentive to extract a component of Kondo and add it to the system of Hamada. The Office Action says one skilled in the art would combine a masked storage of Kondo et al. into Hamada "so that the readout information charge transferred from image section can be accurate without effecting by any unwanted incident light." Applicant can make no sense of this reason, but observes that Hamada stated he was striving to maximize use of his sensor to form coarse and fine images and also to avoid large chip size and avoid increases in power consumption (see Hamada, columns 3 and 4). Why, in such circumstance, would a person skilled in the art, looking at Hamada, consider extracting a feature of Kondo et al. and taking the mask thereof to cover some of the pixels of Hamada (therefore using some of the Hamada sensor) or, alternatively, adding more sensor area and masking it (therefore requiring more power consumption). Both of these suggested combinations would conflict with stated objectives of Hamada.

Second, when the mask of Kondo is added to Hamada, Hamada would no longer function as intended or, indeed function at all. (For example, would the mask cover one or both of parts of the "accumulation pixels" rows of Hamada, or the "selective communication" pixels, and how would such a mask be configured?)

Third, even if the mask of Kondo were added to Hamada, as demonstrated above, one would still not have the claimed invention, as the steps of Applicant's claims are different than those taught by Hamada.

Accordingly, for all the reasons set forth, independent claim 15, and the claims which depend therefrom, should be deemed allowable over the art of record.

In view of the foregoing, it is believed that the Application is now in condition for allowance, and such favorable action is earnestly solicited. In the event that the Examiner is not persuaded, it is asked that he kindly telephone the undersigned Counsel collect so that any remaining issues can be resolved.

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Respectfully submitted,



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